Rodent Control in Livestock and Poultry Facilities

B. Lang

Factsheet

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Rats and mice have long been a problem on farms where food and nesting sites are plentiful. These animals consume and contaminate food destined for livestock and other animals, as well as humans. Each rat on a farm will eat, spoil or damage approximately $25 worth of grain per year. The adaptability and agility of these animals make getting rid of them particularly difficult. Mice are capable of running up a vertical surface, negotiating a wire like the finest circus performer and can easily jump to a height of 30 cm (12 in.) from a flat surface.

WHY CONTROL RODENTS?

Damage comes in many forms:

- **Damage to buildings.** Mice and rats will damage wood and electrical wiring, which can be a fire hazard.
- **Destruction of insulation.** Many livestock and poultry facilities show serious deterioration within 5 years. Associated with this damage are costs for re-insulation, increased energy costs and poorer feed conversions by animals.
- **Feed consumed.** A colony of 100 rats will consume over 1 tonne of feed in 1 year.
- **Feed contaminated.** A rat can contaminate ten times the amount of feed it eats with its droppings, urine and hair. A rat produces 25,000 droppings per year, a mouse 17,000. The U.S. Department of Agriculture estimates that the equivalent of more than $2 billion in feed is destroyed by rodents each year.
- **Biosecurity.** Rodents are recognized as carriers of approximately 45 diseases, including salmonellosis, pasteurellosis, leptospirosis, swine dysentery, trichinosis, toxoplasmosis and rabies. Mice and rats can carry disease-causing organisms on their feet, increasing the spread of disease.

UNDERSTANDING RODENTS

Mice and rats have tremendous breeding potential. Under ideal situations, a pair of rats and their offspring can produce 20,000,000 young in 3 years. Mice reproduce even faster. One female mouse can give birth to 5–10 litters per year, yielding five to six young per litter. The gestation period is a mere 19–21 days. These babies are sexually mature in 6–10 weeks. The average female mouse lives to be 9 months. One female rat is capable of producing another 22 breeding females in 1 year (assuming a 50:50 male/female ratio of offspring), which mature in 3 months after parturition.

Rats and mice have poor eyesight but excellent senses of smell, taste, touch and hearing. They do not like open areas and prefer contact with walls and other objects. They do not range far from the nest. The maximum range for rats is 45 m (148 ft), for mice 9 m (30 ft). Rats are extremely apprehensive about new objects and will avoid them for several days. Leaving a trap out for about 5 days is necessary to ensure acceptance. Mice quickly accept new objects. These tendencies become very important when designing baiting or trapping programs.

DOES YOUR FARM HAVE A PROBLEM?

Producers should not be embarrassed to admit they have a rodent problem. Surveys in Ontario indicate that 80% of poultry producers and 89% of swine producers have rodent problems. The probability is that mice or rats currently exist on your farm. The embarrassment and costs occur if something is not done to confront the problem.

Ministry of Agriculture, Food and Rural Affairs

Ontario

The following are signs of rodent infestation:

- **Sounds.** Gnawing, climbing noises in walls, squeaks.
- **Droppings.** Found along walls, behind objects and near food supplies.
- **Burrows.** Rat burrows are indicated by fresh diggings along foundations, through floorboards into wall spaces.
- **Runs.** Look for dust-free areas along walls and behind storage material.
- **Gnawing marks.** Look for wood chips around boards, bins and crates. Fresh gnawing marks will be pale in colour.
- **Rodent odours.** Persistent musky odours are a positive sign of infestation.
- **Visual sighting.** Daylight sighting of mice is common. Rats are seen in daylight only if populations are high. Quietly enter your barn at night, wait in silence for 5 minutes and listen for the sound of rodent activity. Look around with a powerful flashlight; rat eyes will reflect the light.
- **Smudge marks.** These may be found on pipes or rafters where dirt and oil from their fur leave a greasy film.

It is a generally accepted rule of thumb that there are approximately 25 mice or rats for every one that is seen.

IS IT A RAT OR A MOUSE PROBLEM?

Since rats and mice require different control strategies, determine whether the problem is rats or mice (Table 1). The simplest way to differentiate between the types of infestation is by examining the droppings. Mouse droppings are black and rice-kernel size, whereas rat droppings are black and bean-sized.

WHAT DO MICE AND RATS LIKE TO EAT?

Rats and mice can be considered to be omnivorous. Given a choice, they prefer cereal grains. Rats eat meat when available. However, when food supplies are scarce, they will eat almost anything, including plaster and even soap or animal carcasses. Mice have been known to nest over winter inside the carcass of a deer stricken with rabies, consume the meat and become infected. They then become vectors of this disease. Rats and mice eat every day and prefer a water supply. Rats usually drink every day, but mice can survive several days without water.

Table 1. Physical and behavioural characteristics of adult rats and mice

Characteristic	Norway Rat	Mouse
Size (including tail)	42 cm (16.5 in.)	16 cm (6 in.)
Average weight (adult)	500 gm (18 oz)	20 gm (0.7 oz)
When active	nocturnal	nocturnal
Sight	poor (1.5 m) (4.9 ft)	poor (1 m) (3 ft)
Smell, touch, taste	excellent	excellent
Hearing	highly accurate	highly accurate
Range from nest	45 m (148 ft)	9 m (30 ft)
Fear of new objects	3–7 days	3 min–5 hr
Water requirements	daily	2–4 days without
Food per day	28 gm (1 oz)	3 gm (0.1 oz)
Water	57 gm (2 oz)	3 gm (0.1 oz)
Favourite foods	rolled oats, meat, fish, vegetable oil	grains, rolled oats, sugar, raisins
Droppings	bean size	rice size
Minimum width for entrance (hole diameter)	12 mm (0.5 in.)	6 mm (0.2 in.)
Can chew through (given edge to gnaw on)	rubber, alumimum, cinder blocks, plastic, wool	same as rats

RODENT CONTROL (THE PRINCIPLES)

Rodent control requires an integrated pest-management strategy involving many techniques. The producer's first objective should be to prevent, or at least greatly reduce, rodent numbers through management programs that eliminate entrance to the facility, nesting sites for the rodents, food supplies and water. Populations build when food, water and nesting sites are readily available.

Habits and Biology

To control mice and rats, we have to understand their habits and biology first. Mice and rats are similar in their habits and biology, although there are some differences between the two (Table 1).

- Both are highly reproductive and extremely capable of surviving in all kinds of conditions. Theoretically, if there is one pair of mice (1 male and 1 female) in your barn at the beginning of a year, under fair living conditions, by the end of the year, you may have thousands of them on your farm.

- On farms, mice and rats will be near a food source such as barns, granaries, livestock buildings and silos.
- Rats and mice can climb and jump. Rats can jump vertically as high as 91 cm (36 in.) and horizontally as far as 122 cm (48 in.).
- Mice and rats can climb brick and other rough walls, and travel along utility wires.
- Rats can cross (sneak in) through openings as small as 1 cm (½ in.) and mice can squeeze through openings of 0.6 cm (¼ in.), or less, in diameter.
- Both mice and rats are active at night, particularly right after dusk.
- Rats are smart and tend to avoid new objects. Therefore, it may take a few days for traps and baits to work.

Rodent-Proofing Farm Buildings

Proper construction and maintenance of buildings helps prevent rodents from entering your barn. Initial construction footings should extend 0.5 m (19 in.) into the ground with an apron that extends 0.2 m (8 in.) outward. This prevents rodents from burrowing into your building. To prevent frost damage, footings may have to be deeper. Examine your building at least once a year for possible entry ways for rodents. Remember, a mouse needs only a 0.6-cm (¼-in.) opening to gain access; rats need a 1-cm (½-in.) opening. Cracks around door frames, under doors, broken windows, water and utility hook-ups, vents and holes surrounding feed augers are potential points of entry. Use coarse steel wool, hardware cloth or sheet metal to cover any entrances. Do not use plastic, wood or insulation, as rodents simply gnaw their way through.

When constructing walls, ensure that sheeting lies flush to the wall studs rather than on strapping. This keeps nesting sites confined to a single section between studs rather than allowing complete access to all wall spaces. For further information, see Plan No. M 9451 of the Canada Plan Service Series, *Rodent and Bird Control in Farm Buildings*. A well-maintained structure is your first defence against rodents. Most rodents enter your barn directly from the fields, then the population builds. It is important to maintain good sanitation outside the barn. Eliminate vegetation for 1 m (3 ft) around buildings, clean up spilled feed, remove loose wood, garbage, etc. Do not attract rodents from fields to your operation.

Eliminating Hiding Places and Nesting Sites

Rodents do not like to be exposed. Maintain sound housekeeping, eliminate loosely piled building materials, old feed bags or anything else that a rodent can hide in or under. Keep piles of lumber, miscellaneous equipment 24–30 cm (9–12 in.) off the floor and at least 24 cm (9 in.) out from a wall. Look for entrances into double wall construction. Most rodents nest in the insulation of double walls. Block off all entrances into walls and destroy all nesting material.

Remove Food and Water

Eliminate water sources such as leaky taps, open water troughs, sweating pipes and open drains. Keep all feeds in rodent-proof bins, covered cans or metal hoppers. Reduce feed spillage and immediately dispose of dead animals. Without readily available food and water, populations cannot build.

CONTROL OF EXISTING POPULATION

If there is already a rodent problem inside the barns, prevention alone won't solve the problem. In this case, consider a population-reduction program.

Snap Traps

For small populations, snap traps or box traps are very useful for eliminating rodents. Rats prefer fresh bacon, fish and meat, while mice favour cheese, peanut butter or seeds. Try several baits to find out which your rodents prefer. Rats are distrustful of anything new in their environment, so leave baited non-set traps out for 4–5 days to allow them to get used to the traps. Ensure that previous baits have been taken before actually setting the traps. If rats are the problem, use rat traps. If mice are the problem, use a mouse trap. Locate traps close to walls, behind objects, in dark corners, where you see droppings or gnaw marks. When trapping next to a wall, set the trap at right angles to the wall with the trigger and bait closest to the wall. Orient multiple-catch traps with the entrance hole parallel to the wall. Live traps can work very well near runways used by mice and rats.

Glue Boards

Glue boards are very effective against mice and are the method of choice in locations where toxic baits are a concern. Glue boards will not work well if there is too much dust. They are only recommended where dust can be kept away from them. Check glue boards and traps daily and remove and dispose of dead mice and rats. Wear rubber gloves when handling them to prevent any chance of disease infection.

Abundant food supplies make baited traps less effective. Eliminate as many sources of food as possible before starting the program. For barns and poultry houses with moderate infestations, set 50–100 traps. The trapping program should be short and decisive to prevent trap shyness. Odours from humans or previously caught rodents do not cause trap shyness. When disposing of dead rodents, use plastic gloves and place the rodents in tightly sealed plastic bags.

Predators

Cats may limit low-level mouse or rat populations. However, if conditions are ideal for rodents, cats cannot eliminate a problem. Cats may introduce disease into a facility by bringing in rodents caught in fields. Cats will not be able to catch mice as quickly as they multiply.

Sound and Ultrasound Devices

These two methods may not be effective. Rodents may be frightened by strange noises in the first few day but then quickly become used to them.

Rodenticides (Toxic Baits)

All products are poisonous to other animals. Always observe label precautions regarding use, handling and storage.

The Ontario Ministry of Environment is responsible for regulating pesticide sale, use, transportation, storage and disposal in Ontario. Ontario regulates pesticides by placing appropriate education, licensing, and/or permit requirements on their use, under the *Pesticides Act* and Regulation 63/09.

All pesticides must be used in accordance with requirements under the *Pesticides Act* and Regulation 63/09 (available at www.e-laws.gov.on.ca or call ServiceOntario Publications toll-free number 1-800-668-9938 or 416-326-5300).

Ontario farmers, as defined by the *Pesticides Act* and Regulation 63/09, may purchase and use Class 4, 5, and 6 pesticides for rodent control. Under Regulation 63/09 of the *Pesticides Act*, Ontario farmers must be certified to purchase and use Class 3 pesticides for rodent control on their farms. To be certified, a farmer must successfully complete the Grower Pesticide Safety Course. Certified farmers may also purchase Class 4, 5, and 6 products. Class 5 and 6 pesticides for rodent control can be used by homeowners.

Table 2. List of approved active ingredients for rodent control in Ontario*, May 2010

Active Ingredient	Ontario Approved Class(es)
brodifacoum	4,6
bromadiolone	4,5,6
bromethalin	3
cellulose from powdered corn cobs	4,5,6
chlorophacinone	4,5,6
difethialone	4,6
diphacinone	4,5,6
warfarin and sulfaquinoxaline	4,6
warfarin	3,4,5,6
zinc phosphide	3

*excludes Class 1 products used by manufacturers

There are two basic types of rodenticides: acute poisons and anti-coagulants. Use rodenticides (Table 2) when control of moderate-to-large rodent populations is necessary. Many of the newer anti-coagulant products, i.e., bromadiolone and brodifacoum require single feedings by rodents to cause mortality. Occasionally, rodents may develop a bait shyness after being made sick but not killed by a rodenticide. The shyness develops to the bait carrier, e.g., grain, and not to the rodenticide. Simply use another formulated product or different attractant if bait shyness develops. For rats, prebait using baits without the poison for about 1 week to get them accustomed to the bait. Place baits in areas of high rodent activity. Many people underbait in their control program. Baits should be 1–2 m (3–6 ft) apart for mice and 7–10 m (23–33 ft) for rats. **Remove all uneaten baits and properly dispose of them after the poisoning program.**

PRECAUTIONS WHEN USING RODENTICIDES

Ideally, cover all baits to **prevent consumption** by children, cats, dogs, poultry and swine. This can be done by placing baits in bait stations or bait boxes that allow ready access by rodents but prevent larger animals from gaining access. A baiting station designed from PVC piping (Figure 1) has proven very effective in reducing rodent numbers. The cap and interior baffles keep the bait from falling out.

The advantages of this station include:

- station is easy to fill and replenish
- bait stays dry, making baits more attractive to rodents
- small entrance attracts rodents and increases feeding, particularly if plenty of additional feed is available
- design prevents feeding by pets, birds and livestock

Ensure that pets, livestock and poultry have no access to water bait stations.

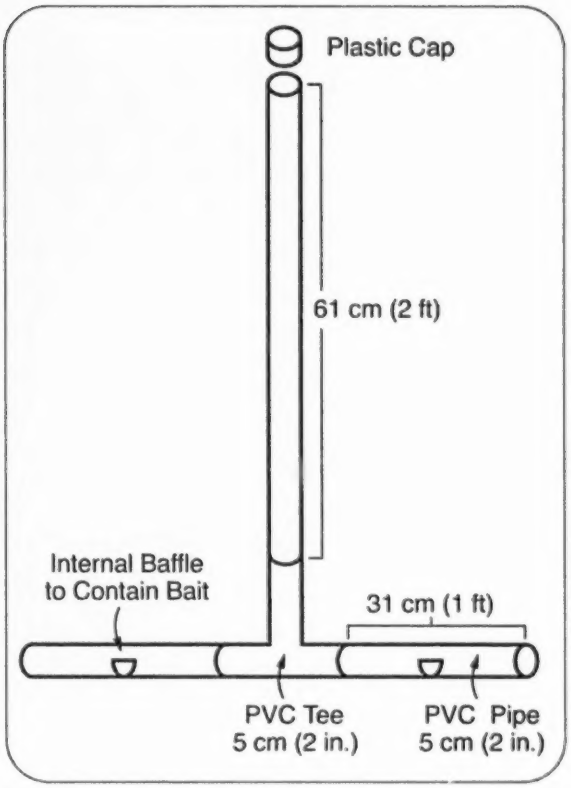

Figure 1. Drawing of a safe, effective, homemade baiting station. Purdue University.

CONCLUSION

Elimination of rats and mice from livestock and poultry barns is extremely difficult. It is preferable for producers to prevent infestations from occurring. If a problem does exist, the options described in this Factsheet should be useful in limiting rat and mice populations.

REFERENCES

Factsheet: *Rodent Control.* Solvay Animal Health, Inc.

The Veterinarian's Guide to Managing Poisoning by Anticoagulant Rodenticides. Liphatech. 2001.

Ontario Ministry of the Environment. www.ene.gov.on.ca/en/land/pesticides/index.php

Ontario Ministry of the Environment. Pesticide Product Information System. http://app.ene.gov.on.ca/pepsis/

This Factsheet was originally authored by G.A. Surgeoner, Professor, University of Guelph, and revised by Betty Summerhayes, Product Development Specialist, OMAFRA, Guelph, and Brian Lang, Dairy Cattle Production Systems Specialist, OMAFRA, Woodstock.

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FOR YOUR NOTES

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Agricultural Information Contact Centre:
1-877-424-1300
E-mail: ag.info.omafra@ontario.ca
Northern Ontario Regional Office:
1-800-461-6132

www.ontario.ca/omafra

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